

What is claimed is:

1           1.     An apparatus for temperature-conditioning a wafer, the apparatus  
2 comprising:

3                 a heat transfer plate having an upper surface;

4                 a heating or cooling device integrated with said heat transfer plate; and

5                 a plurality of spacers projecting upwardly from the upper surface of said heat  
6 transfer plate at different locations thereon spaced from one another such that a  
7 wafer to be temperature-conditioned by heat transferred between said heat transfer  
8 plate and the wafer can be supported by the spacers while facing and being spaced  
9 from said heat transfer plate, said spacers being supported in the apparatus in such  
10 a way that the heights of projections provided by the spacers, as taken from the  
11 upper surface of said heat transfer plate, can be individually adjusted, whereby the  
12 spacing between a wafer, supported by the spacers, and the heat transfer plate and  
13 the inclination of the wafer relative to the upper surface of said heat transfer plate  
14 can be adjusted.

1           2.     The apparatus for temperature-conditioning a wafer as claimed in  
2 claim 1, and further comprising a plurality of guide pins extending from the upper  
3 surface of said heat transfer plate at the periphery of the upper surface, and  
4 wherein each of said spacers comprises an annular member fitted freely around a  
5 respective one of said guide pins, whereby the annular member can be freely  
6 withdrawn from the guide pin so as to be replaceable.

1           3.     The apparatus for temperature-conditioning a wafer as claimed in  
2 claim 1, wherein each of said spacers is supported in the apparatus so as to be to  
3 be vertically movable and fixable in different vertical positions relative to the upper  
4 surface of said heat transfer plate.

1           4.     The apparatus for temperature-conditioning a wafer as claimed in  
2 claim 3, wherein each of the spacers comprises a pin threaded to the heat transfer  
3 plate so that the amount by which the spacer projects from the upper surface of said  
4 heat transfer plate can be adjusted by rotating the pin.

1           5.     The apparatus for temperature-conditioning a wafer as claimed in  
2     claim 4, and further comprising a plurality of motors each operatively associated with  
3     a respective one of said spacers, and a power transmission mechanism coupled  
4     between each of said motors and the spacer operatively associated therewith so as  
5     to transmit output torque of the motor to the spacer, whereby the motors rotate the  
6     spacers to raise and lower the same relative to said heat transfer plate.

1           6.     A method of temperature-conditioning a wafer, the method comprising  
2     :     determining a desired distribution of surface temperatures across a wafer to  
3     be produced by a temperature-conditioning process;

4             placing a wafer in position above the upper surface of a heat transfer plate of  
5     a temperature-conditioning apparatus, which heat transfer plate produces heat used  
6     in carrying out the temperature-conditioning process;

7             while the wafer is spaced above the upper surface of the heat transfer plate,  
8     transferring heat between the heat transfer plate and the wafer to temperature-  
9     condition the wafer; and

10            before the wafer is temperature-conditioned, determining a spacing of the  
11     wafer from the upper surface of the heat transfer plate and an inclination of the  
12     wafer relative to the upper surface of the heat transfer plate tending to produce said  
13     desired distribution of surface temperatures across the wafer when the wafer is  
14     heat-treated, and wherein said placing of the wafer in position comprises setting the  
15     wafer above the heat transfer plate with said spacing and said inclination relative to  
16     the upper surface of the heat transfer plate.

1           7.     The method of temperature-conditioning a wafer as claimed in claim 6,  
2     wherein said determining of the desired distribution of surface temperatures  
3     comprises measuring temperatures at different locations across the surface of the  
4     wafer after the wafer is temperature-conditioned in a different temperature-  
5     conditioning apparatus, and selecting as the desired distribution of surface  
6     temperatures one which corresponds to the measured temperatures.

1           8.     The method of temperature-conditioning a wafer as claimed in claim 6,  
2     wherein said placing of the wafer in position comprises setting the wafer atop

3     spacers projecting above the upper surface of the heat transfer plate, and adjusting  
4     the spacers to vary the amounts by which they project above the upper surface to  
5     ones necessary for producing the desired distribution of surface temperatures while  
6     the wafer is supported by the spacers above the heat transfer plate as the wafer is  
7     being heat-treated.

1             9. The method of temperature-conditioning a wafer as claimed in claim 7,  
2     wherein said placing of the wafer in position comprises setting the wafer atop  
3     spacers projecting above the upper surface of the heat transfer plate, and adjusting  
4     the spacers to vary the amounts by which they project above the upper surface to  
5     ones necessary for producing the desired distribution of surface temperatures while  
6     the wafer is supported by the spacers above the heat transfer plate as the wafer is  
7     being heat-treated.